This course is designed for first year Ph.D. students who eventually want to do research either in theoretical econometrics or in any other fields that have to estimate and test their economic models and/or conduct policy analysis. An Economic model is a family of probability distributions proposed by a researcher that could possibly have generated the data of some economic variables (viewed as random variables). Given the economic data (either cross section or time series or panel), a researcher would like to select a particular probability distribution from the family of distributions to “best match” the data.

In this course we take economic models as given, but will learn how to estimate a general class of parametric models or semiparametric models, how to conduct testing and inference given the data. We shall present all classical estimation and inference procedures, including linear regression, linear instrumental variables, nonlinear regression, quantile regression, minimum distance, generalized method of moments, maximum likelihood, quasi-maximum likelihood. We will discuss in detail: (1) identification of model parameters; (2) consistency, asymptotic normality, and semiparametric efficiency of various estimators; (3) hypothesis testing and model selection. In particular, we can present all the asymptotic theory within the framework of (non-linear) extreme estimation and testing. Empirical applications include estimation and inference of some popular economic models in microeconomics and macroeconomics. Prerequisite: Econ. 550a or equivalent. Basic knowledge of probability, matrix algebra and mathematical statistics.

Semester offered: Spring